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COUNTRY ANALYSIS BRIEFS

Venezuela

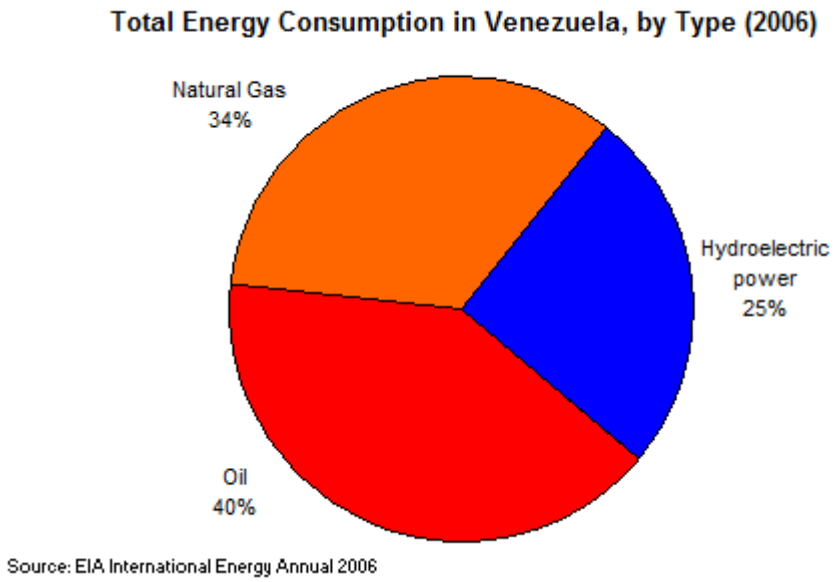
Last Updated: January 2009

Venezuela contains some of the largest oil and natural gas reserves in the world. It consistently ranks as one the top suppliers of U.S. oil imports and is among the top ten crude oil producers in the world.

Background

Venezuela is one of the world's largest exporters of crude oil and the largest in the Western Hemisphere. In 2007, the country was the seventh-largest net oil exporter in the world. The oil sector is of central importance to the Venezuelan economy: it accounts for more than three-quarters of total Venezuelan export revenues, about half of total government revenues, and around one-third of total gross domestic product (GDP). In addition, as a founding member of the Organization of the Petroleum Exporting Countries (OPEC), Venezuela is an important player in the global oil market.

In 2006, Venezuela consumed 3.2 quadrillion Btus of total energy. Natural gas and oil represent the bulk of total energy consumption in Venezuela. After reaching 46 percent of total energy consumption in 1998, the share of natural gas in Venezuela's oil mix has fallen to 34 percent. During the same period, the share of oil consumption has risen from 32 percent to 40 percent. Hydroelectricity represents the remainder of the country's energy mix, and Venezuela is well-endowed with hydroelectric potential.

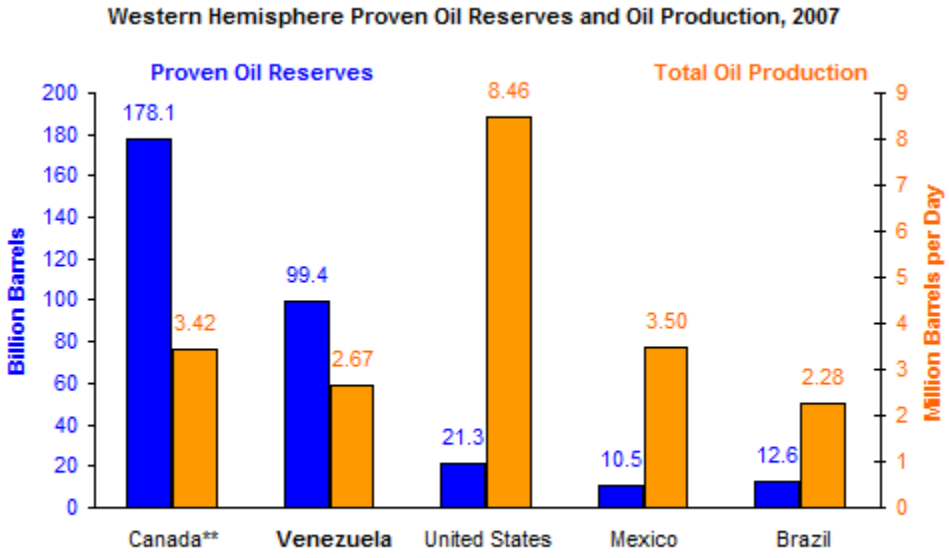


Source: EIA International Energy Annual 2006

Oil

Venezuela was the world's seventh-largest net oil exporter in 2007.

According to *Oil and Gas Journal* (*OGJ*), Venezuela had 99.0 billion barrels of proven oil reserves in 2009, the largest amount in South America. Venezuela is a significant supplier of crude oil to the world market: in 2007, the country had net oil exports of 1.9 million barrels per day (bbl/d), seventh-largest in the world and the largest in the Western Hemisphere. In recent years, crude oil production in the country has fallen, mostly due to natural declines at existing oil fields.



Source: *Oil and Gas Journal;* EIA *Short Term Energy Outlook*

Sector Organization

Venezuela nationalized its oil industry in 1975-1976, creating Petroleos de Venezuela S.A. (PdVSA), the country's state-run oil and natural gas company. Along with being Venezuela's largest employer, PdVSA accounts for about one-third of the country's GDP, 50 percent of the government's revenue and 80 percent of Venezuela's exports earnings. In 2002, nearly half of PdVSA's employees walked off the job, in protest against the rule of President Chavez. The strike severely impacted PdVSA, practically bringing the company's operations to a halt. PdVSA fired 18,000 workers following the strike, draining the company of technical knowledge and expertise.

Industry analysts speculate that the strike did permanent damage to PdVSA's production capacity and remains the contributing factor to continued declines in production in recent years.

Investment in Maintaining/Expanding Production

Industry analysts estimate that PdVSA must spend some $3 billion each year just to maintain production levels at existing fields, as many of these fields suffer annual decline rates of at least 25 percent. Affecting PdVSA's ability to meet its investment goals are the increasing demands placed upon its finances by the Venezuelan government. The company spends billions of dollars per year on social spending and other non-oil investments, including the financing of infrastructure projects, direct operation of social programs, and taxes, royalties, and other transfers to the government.

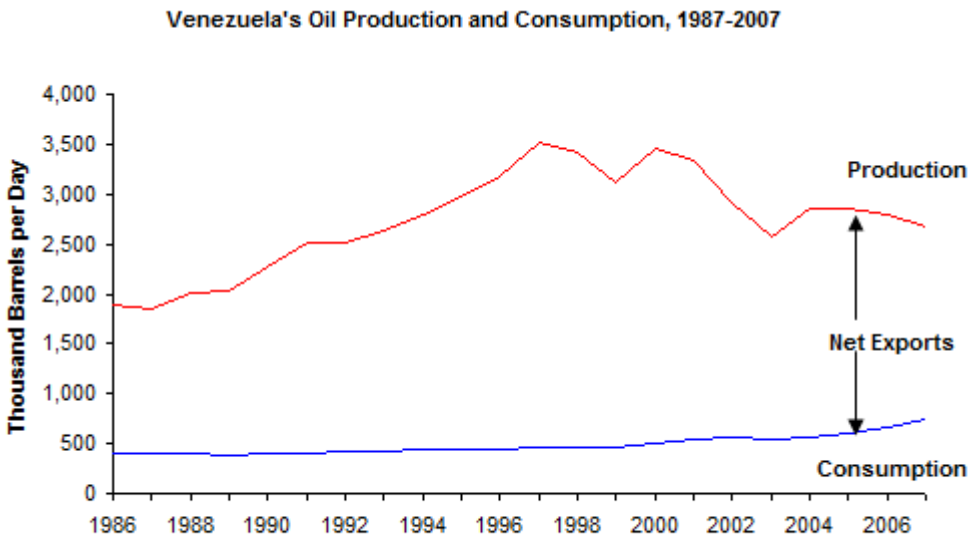
Foreign Operators

In the 1990s, Venezuela opened its upstream oil sector to private investment. This collection of policies, called *apertura*, facilitated the creation of 32 operating service agreements (OSA) with 22 separate foreign oil companies, including international oil majors and small independents. Under these contracts, companies operated oil fields, and PdVSA paid these companies a fee and purchased the produced crude at a price pegged to market rates. PdVSA also offered eight blocks under risk/profit sharing agreements (RPSA), under which PdVSA had an option to purchase up to a 35 percent equity stake in the project if the foreign operator discovered commercial quantities of oil in the exploration phase. Finally, Venezuela established four "strategic associations" that produce extra-heavy crude, in which PdVSA held a financial interest.

In the last 10 years, Venezuela has moved to largely undo most of the *apertura*initiatives, including mandating PdVSA majority ownership of all oil projects and increasing tax and royalty rates on new and existing projects. The efforts culminated with the 2007 transition of the four extra-heavy strategic associations to new structures with PdVSA majority ownership. Of the six companies involved in the projects, two reduced their holdings to allow space for the enlarged PdVSA share (Total and Statoil), two maintained their previous stakes (Chevron, BP), and two exited completely from the projects (ConocoPhillips and ExxonMobil). Recent attempts by Venezuela to attract foreign investment to the oil sector have focused on foreign national oil companies (NOCs), including those from China, India, Iran, and Russia.

Exploration and Production

Venezuela's actual level of oil production is difficult to determine, with the government and independent industry analysts offering differing estimates. Most industry analysts and EIA estimate that the country produced around 2.7 million bbl/d of oil in 2007. Another factor that complicates comparisons of Venezuelan oil production estimates are methodological and classification issues. For example, EIA estimates that, of Venezuela's 2.7 million bbl/d of oil production, 2.4 million bbl/d was crude oil and 300,000 bbl/d was condensate and natural gas liquids (NGL). On the other hand, it is unclear what "other liquids" are included in official estimates of oil production. Another methodological issue is the measuring of crude oil production by the four extra-heavy strategic associations (see below). Some analysts count the extra-heavy oil produced by the associations as part of Venezuela's crude oil production. Others (including EIA) count the upgraded syncrude, which is about 10 percent lower than the volume of the original extra-heavy feedstock, produced by the four as part of Venezuela's crude oil production instead.



Source: EIA *International Energy Annual; International Petroleum Monthly; Short Term Energy Outlook*

PdVSA

It is difficult to assess how much oil PdVSA actually produces, due to the issues discussed above. Independent analysts and EIA estimate that the company produced around 1.5 million bbl/d of crude oil in 2007, or around 60 percent of Venezuela's total crude oil production. This represents a decrease of 30 percent below independent estimates of pre-strike PdVSA crude oil production of 2.2 million bbl/d.

Venezuela has four major sedimentary basins: Maracaibo, Falcon, Apure, and Oriental. The crude oil held in these fields has an average API gravity of less than 20°, making Venezuela's conventional crude oil heavy by international standards. Much of Venezuela's crude oil production is also very sour, i.e. containing high levels of sulfur. As a result, much of Venezuela's oil production must go to specialized domestic and international refineries. The Maracaibo basin contains slightly less than half of PdVSA's oil production. The fields in this area are very mature, requiring heavy investment to maintain current capacity. Centers of production in the area include Tomoporo, Lagunillas, and Tiajuana. In order to mitigate steep decline rates in the Maracaibo Basin, PdVSA re-injects natural gas into the reservoirs in order to increase pressure. In general, the fields in the Oriental basin are less mature than those in the west, and they were some of the first fields brought online after the 2002-2003 strike.

Strategic Associations

Venezuela contains billions of barrels in extra-heavy crude oil and bitumen deposits, most of which are situated in the Orinoco Belt in central Venezuela. Estimates of the recoverable reserves from the Orinoco Belt range from 100 to 270 billion barrels. Venezuela has established four strategic associations to exploit these resources. The strategic associations convert the extra heavy crude and bitumen from approximately 9° API to lighter, sweeter crude, known as syncrude. According to industry estimates, the four projects have installed production capacity of about 600,000 bbl/d of syncrude (see table), though actually production is below these levels due to periodic downtime and turnarounds.

Orinoco Belt Strategic Associations				
Project Name (Old Name)	**Petroanzoategui (Petrozuata)**	**Petromonagas (Cerro Negro)**	**Petrocedeno (Sincor)**	**Petropiar (Hamaca)**
Partners (percent)	PdVSA (100)	PdVSA (83.34), BP (16.66)	PdVSA (60), Total (30.3), Statoil (9.7)	PdVSA (70), Chevron (30)
Startup Date	October 1998	November 1999	December 2000	October 2001
Extra-Heavy Crude Production (bbl/d;	120,000; 9.3°	120,000; 8.5°	200,000; 8-8.5°	200,000; 8.7°

API)				
Syncrude Production (bbl/d; API)	104,000; 19-25°	105,000; 16°	180,000; 32°	190,000; 26°

Venezuela plans to aggressively develop the Orinoco Belt oil resources in the coming years. PdVSA has begun a reserves certification program to increase the amount of proven oil reserves held by the country. The program, dubbed “Magna Reserva,” includes seismic studies conducted by their company and several foreign partners in 27 blocks, and it is the first step towards more aggressive development of the Orinoco Belt reserves. PdVSA has teamed almost exclusively with foreign national oil companies for the program, including Petrobras (Brazil), Petropars (Iran), CNPC (China), and ONGC (India). In 2008, Venezuela announced that the project had already certified 50 billion barrels of new reserves, about half of which exist in the Carabobo block, which had been jointly explored by PdVSA and Petrobras.

In October 2008, Venezuela launched its latest oil bid round, the first held under President Chavez. The round included the extra-heavy oil reserves in the Orinoco Belt that are in the process of certification. This round specifically focused on 7 blocks in the Carabobo area. PdVSA would take a majority stake in each venture, which would include integrated upstream and upgrading projects. According to government estimates, the blocks could contain at least 12.5 billion barrels of recoverable reserves and could eventually produce over 800,000 bbl/d of upgraded crude oil.

Joint Ventures

Along with private partners, PdVSA owns majority stakes in numerous joint ventures (JVs). These companies manage projects formally operated under the old operating service agreements (OSAs). According to industry estimates, the fields operated by the JVs produced around 400,000 bbl/d of oil in 2007. Many of these fields are small and marginal, with steep decline rates that require constant re-investment in order to maintain production levels.

Risk/Profit Sharing Agreements

Venezuela had previously awarded some oil blocks under a Risk/Profit Sharing Agreements (RPSA), in which private companies could conduct exploration operations and PdvSA could then buy into the project in the development phase. In early 2008, Eni reported that it had brought the Corocoro field onstream in the Gulf of Paria, a field that had been originally pursued under the RPSA framework. The Corocoro field is expected to reach peak production of 55,000 bbl/d.

Exports

In 2007, Venezuela consumed about 740,000 bbl/d of oil and had net oil exports of around 1.9 million bbl/d. The United States is the largest destination of Venezuela’s petroleum exports. In 2007, the United States imported 1.36 million bbl/d of crude oil and petroleum products from Venezuela, down from 1.42 million bbl/d in 2006. In recent years, Venezuelan oil exports to the United States have been in decline, after peaking at 1.77 million bbl/d in 1997. In addition, Venezuela’s share of U.S. oil imports has fallen from 50 percent in 1960 to 10 percent in 2007. Much of the recent decline has been led by falling exports of refined petroleum products, which have declined from 379,000 bbl/d in 1997 to 212,000 bbl/d in 2007. The U.S. Gulf Coast is the largest recipient of Venezuelan crude oil imports, with refineries there specifically configured to handle Venezuelan heavy crude varieties.

Besides the United States, other important destinations of Venezuelan petroleum exports include South America, Europe, and the Caribbean, though much of the crude oil that is exported to the Caribbean is later re-exported as petroleum products to the United States or other locations. One of the fastest growing destinations of Venezuelan crude oil exports has been China. In 2007, China imported about 80,000 bbl/d of oil from Venezuela, roughly the same as 2006 but up from 39,000 bbl/d in 2005. In recent years, Venezuela has prioritized the diversification of its petroleum export destinations away from the United States, but the U.S. market will likely remain Venezuela’s most important customer for the foreseeable future.

Discounted Oil Programs

Venezuela provides a sizable amount of crude oil and refined products to its regional neighbors at below-market prices and with favorable financing terms. Under the Petrocaribe initiative, Venezuela provides crude oil and refined products to numerous countries in the Caribbean and

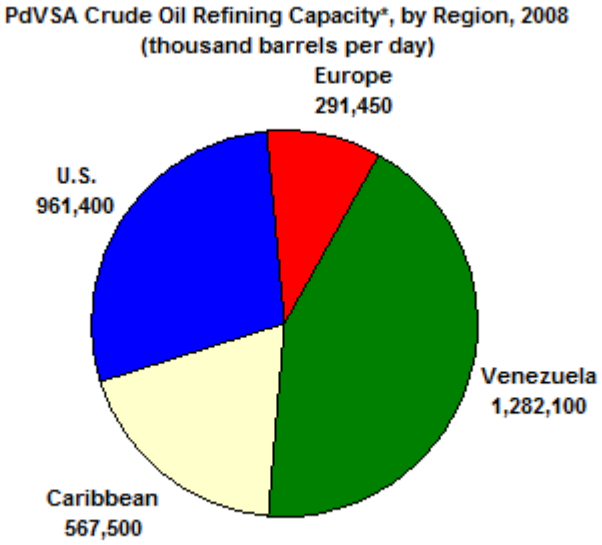
Central America, offering favorable financing and long repayment terms that often feature barter arrangements instead of cash transactions. According to industry accounts, Venezuela supplies around 80,000 bbl/d of oil under this programs. According to the Venezuelan government, it has supplied 59 million barrels of oil to these countries in the Petrocaribe system since 2005. In addition, Venezuela has a separate supply agreement with Cuba, which, according to industry reports, amounts to about 90,000 bbl/d of crude oil and petroleum products.

Pipelines

Venezuela has an extensive domestic oil pipeline system, providing transportation from production centers to refineries and coastal export terminals. Currently, the country does not have any export pipelines, but there has been discussion about constructing an oil pipeline to port in Colombia along the Pacific Ocean. This would facilitate greater Venezuelan crude exports to Asia, bypassing the Panama Canal bottleneck or the high costs of shipping around Cape Horn.

Refining

According to *OGJ*, Venezuela had 1.28 million barrels per day (bbl/d) of crude oil refining capacity in 2009, all operated by PdVSA. The major facilities include the Paraguana Refining Center (940,000 bbl/d), Puerto de la Cruz (195,000 bbl/d), and El Palito (126,900 bbl/d). Through PdVSA and its subsidiary CITGO, Venezuela also controls significant refining capacity outside of the country.



Source: PdVSA, CITGO, *Oil and Gas Journal* *Includes direct operatorship and equity stakes

CITGO

CITGO is a wholly-owned subsidiary of PdVSA that has some 14,000 branded retail outlets (both directly owned and affiliates) in the United States. CITGO operates three product refineries (Lake Charles, LA; Corpus Christi, TX; Lemont, IL), with a combined crude oil distillation capacity of 755,400 bbl/d. CITGO sources most of its crude oil under long-term contracts with PdVSA, though the Lemont facility receives most of its feedstock from Canada. Besides its holding through CITGO, PdVSA also owns shares in some U.S. crude oil refining capacity directly, including a 50 percent stake in the Chalmette facility in Louisiana and certain units at ConocoPhillips' Sweeny, Texas refinery.

Caribbean/South America

PdVSA holds a 50 percent equity interest in the Hovensa refinery, located in St. Croix, U.S. Virgin Islands. Amerada Hess holds the other 50 percent interest in the refinery, which has a capacity of 495,000 bbl/d. The U.S. Virgin Islands imported around 300,000 bbl/d of crude oil from Venezuela in 2007. In the Netherlands Antilles, PdVSA leases the 320,000-bbl/d Isla refinery on the island of Curacao. Most of the products produced by these refineries are exported to the U.S. or other regional markets.

Europe

PdVSA participates in two joint refining ventures in Europe, with the company holding equity interest in 291,000 bbl/d of refining capacity in the region. PdVSA holds a 50 percent stake in AB Nynas, a Swedish company that operates five refineries: Nynashamm (Sweden), Gothenburg (Sweden), Antwerp (Belgium), Eastham (England), and Dundee (Scotland); PdVSA's share of this capacity is 50,500 bbl/d. PdVSA also holds a 50 percent stake in Ruhr Oel, in partnership with BP. Ruhr Oel holds ownership stakes in five German refineries, Gelsenkirchen, Neustad, Karlsruhe, and Schwedt, with PdVSA's share of this capacity totaling 241,000 bbl/d.

Natural Gas

Venezuela has the second-largest natural gas reserves in the Western Hemisphere.

According to *Oil and Gas Journal*, Venezuela had 171 trillion cubic feet (Tcf) of proven natural gas reserves in 2009, the second largest in the Western Hemisphere behind the United States. In 2006, the country produced and consumed 1 Tcf of natural gas. An estimated 90 percent of Venezuela's natural gas reserves are associated, meaning that they occur along with oil reserves. According to Enagas, the principle government agency charged with regulating the natural gas sector, the petroleum industry consumes over 70 percent of Venezuela's natural gas production, with the largest share of that consumption in the form of re-injection to aid crude oil extraction.

Sector Organization

In 1999, Venezuela adopted the Gas Hydrocarbons Law, which opened all aspects of the natural gas sector to private investment. The goals of the law included the development of natural gas resources, especially non-associated fields; expansion of the domestic natural gas transport network, creation of a general distribution system; promotion of natural gas export projects; and increased consumption of natural gas by the power and petrochemical industries.

The Gas Hydrocarbons Law also allowed private operators to own 100 percent of non-associated projects, a sharp contrast to the ownership rules in the oil sector. Furthermore, royalty and income tax rates on non-associated natural gas projects are much lower than corresponding rates for oil projects. The law does give PdVSA the right to purchase a 35 percent stake in any project that moves into commercial status.

Exploration and Production

PdVSA produces the largest amount of natural gas in Venezuela. There is currently limited private participation in the sector. Repsol-YPF is the largest private natural gas producer in Venezuela. In September 2005, Repsol-YPF began production from the first stage of its Barrancas Block project, which contains an estimated 2-6 Tcf of natural gas reserves. The project integrates natural gas production and an 80-megawatt (MW) power station in Portuguesa. In April 2004, Total began first production in the Yucal Placer blocks, with an initial output of 100 million cubic feet per day (MMcf/d). Petrobras operates the Tinaco and San Carlos projects, while Argentina's Pluspetrol is developing the Tiznado-Barbacoas field.

Offshore

PdVSA awarded exploration blocks in 2003 in the Plataforma Deltana area, located off Venezuela's northeast coast adjacent to the country's maritime boundary with Trinidad and Tobago. Chevron began exploration in 2004 of the Loran field (Block 2), drilling three wells. The company also announced in June 2005 that it had drilled a successful exploratory well in its adjacent Lau-Lau field (Block 3). Statoil holds the exploration license for the Cocuina field (Block 4), along with equity partner Total. In 2008, Statoil completed its exploratory drilling program in Block 4, with industry reports indicating that it found commercially-viable quantities of natural gas.

In 2005, Russian natural gas company Gazprom won a tender to develop the first stage of the Rafael Urdaneta project. Following a seismic exploration program, Gazprom drilled its first exploratory well in late 2008 in the Urumaco-1 block. According to industry reports, commercial production from the area could begin in 2013. Other areas of interest for offshore natural gas exploration include the Mariscal Sucre project (north of the Paria Peninsula in Sucre state) and the Blanquilla-Tortuga fields (northwest of Isla Margarita). A large share of any future offshore natural gas production would likely supply proposed liquefied natural gas (LNG) projects (see below).

Pipelines

In recent years, Venezuela has improved its domestic natural gas transport network, to allow greater domestic utilization and movement of gas production. The Interconnection Centro Occidente (ICO) system connects the central and western parts of the country, making natural

gas more easily available to domestic consumers and for re-injection into the western oil fields. Once all of the compression stations along the system are built, the ICO will have a capacity of 520 MMcf/d. In late 2008, the Venezuelan government announced that the ICO project was nearly completed, with some smaller sections of the system already in use.

In early 2008, the Antonio Ricaurte pipeline came online, connecting Venezuela with Colombia. Initially, the pipeline will allow Colombia to export natural gas from the Punta Ballenas area to western Venezuela, with contracted volumes ranging from 80-150 MMcf/d. However, current plans call for the flow of the pipeline to be reversed in 2012, with Venezuela exporting 140 MMcf/d of natural gas to Colombia.

Liquefied Natural Gas

In September 2008, Venezuela signed agreements to create three joint venture companies to pursue LNG projects along the northern coast of the country. Each project will consist of a separate liquefaction train at the Gran Mariscal de Ayacucho (Cigma) natural gas complex in Guiria. The first project would source gas from the Plataforma Deltana project, with exports estimated at 4.7 million tons per year (t/y). The second train would use natural gas from the Mariscal Sucre project, also exporting an estimated 4.7 million t/y. The third train would use natural gas from the Blanquilla-Tortuga fields. According to PdVSA, the total investment in the three projects could approach $20 billion, with first exports by 2013.

Proposed LNG Projects in Venezuela

Project Name	*Source of Natural Gas*	*Foreign Partners*	*Export Volumes (million t/y)*	*Estimated Completion*
Train 1	Plataforma Deltana	Galp, Chevron, Qatar Petroleum, Mitsubishi, Mitsui	4.7	2013
Train 2	Mariscal Sucre	Galp, Enarsa, Itochu, Mitsubishi, Mitsui	4.7	2013
Train 3	Blanquilla-Tortuga	Gazprom, Petronas, Eni, EDP	TBD	2016

Quick Facts

Energy Overview

Proven Oil Reserves (January 1, 2009E)	99 billion barrels
Oil Production (2007E)	2.68 million barrels per day
Oil Consumption (2007E)	740 thousand barrels per day
Crude Oil Distillation Capacity (2008E)	1.28 million barrels per day
Proven Natural Gas Reserves (January 1, 2009E)	171 trillion cubic feet
Natural Gas Production (2006E)	1.0 trillion cubic feet
Natural Gas Consumption (2006E)	1.0 trillion cubic feet
Recoverable Coal Reserves (2004E)	528 million short tons
Coal Production (2006E)	8.22 million short tons
Coal Consumption (2006E)	0.08 million short tons
Electricity Installed Capacity (2005E)	22.1 gigawatts
Electricity Production (2005E)	99.2 billion kilowatt hours
Electricity Consumption (2005E)	73.4 billion kilowatt hours
Total Energy Consumption (2006E)	3.1 quadrillion Btus*, of which Oil (40%), Natural Gas (34%), Hydroelectricity (25%), Coal (<1%), Nuclear (0%), and Other Renewables (0%)
Total Per Capita Energy Consumption (2006E)	124 million Btus
Energy Intensity (2006E)	12,373 Btu per $2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2006E)	152 million metric tons
Per-Capita, Energy-Related Carbon Dioxide Emissions (2006E)	5.9 metric tons
Carbon Dioxide Intensity (2006E)	0.6 Metric tons per thousand $2000-PPP**

Oil and Gas Industry

Organization	State-owned Petroleos de Venezuela, SA (PdVSA) is most dominant player; foreign participation occurs in partnership with PdVSA.
Major Oil/Gas Ports	Amuay , Cardon, Puetro de la Cruz
Foreign Company Involvement	BP, Chevron, CNPC, Repsol-YPF, Shell, Statoil, Total
Major Refineries (capacity, bbl/d)	Paraguana Refining Center (940,000), Puerto de la Cruz (195,000), El Palito (126,900)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links
EIA - Venezuela Country Energy Profile
Table 3c: OPEC Oil Production from EIA Short Term Energy Outlook (STEO)

U.S. Government
U.S. Embassy in Caracas, Venezuela
CIA World Factbook - Venezuela
U.S. State Department's Consular Information Sheet - Venezuela
U.S. State Department Background Notes - Venezuela

Associations and Institutions
Organization of American States (OAS)

Foreign Government Agencies
Banco Central de Venezuela
Corporación Venezolana de Guayana
Instituto Nacional de Estadistica
Oficina de Operación de Sistemas Interconectados (OPSIS)
Ministerio de Energía y Minas

Oil and Natural Gas
Citgo
PdVSA

Sources

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American Oil and Gas Insights
Anchorage Daily News
Associated Press
BBC
Business News Americas
Business Week
Cambridge Energy Research Associates
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CIA World Factbook
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